

What is claimed is:

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1. A method of producing a cloned non-human animal comprising the steps of:

- (i) providing a recipient cell;
- 5 (ii) visualizing the nuclear material of the recipient cell using light in the near-infrared region;
- (iii) enucleating the recipient cell;
- (iv) introducing a donor nucleus into the recipient cell to produce a reconstructed zygote;
- 10 (v) activating the reconstructed zygote; and
- (vi) allowing the reconstructed zygote to develop to term.

2. The method of claim 1 in which the nuclear material of the recipient cell is visualized with near-infrared light using two photon laser scanning microscopy.

3. The method of claim 1 wherein the light has a wavelength from about 700 nm to about 1000 nm.

4. The method of claim 1 wherein the recipient cell is enucleated through the use of laser-mediated ablation.

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5. The method of claim 1 wherein the visualization and ablation are conducted using two photon laser scanning microscopy.

6. The method of claim 1, wherein the donor nucleus is genetically modified.

7. The method of claim 1, wherein the reconstructed zygote is transferred to a recipient oviduct.

8. The method of claim 1, wherein the culturing comprises *ex ovo* culture.

9. The method of claim 7 wherein the recipient cell and the donor nucleus are of the same species.

10. The method of claim 1, wherein the animal is an avian.

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11. The method of claim 10, wherein the cloned avian is selected from the group consisting of chickens, ducks, turkeys, quails, ostriches and pheasants.

12. A cloned avian animal produced by the method of claim 10.

13. The cloned avian animal of claim 12 which is genetically modified.

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14. A method of producing a cloned non-human animal comprising the steps of:

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- (i) providing a recipient cell;
  - (ii) visualizing the nuclear material of the recipient cell using light in the near-infrared region;

(iii) enucleating the recipient cell using light in the near-infrared region;

(vi) introducing a donor nucleus into the recipient cell to produce a reconstructed zygote;

(vii) activating the reconstructed zygote; and

5 (vi) allowing the reconstructed zygote to develop to term.

15. The method of claim 14, wherein the light has a wavelength that ranges from about 700 nm to about 1000 nm.

16. The method of claim 14, wherein the recipient cell nucleus is visualized using two photon laser scanning microscopy

17. The method of claim 14, wherein the recipient cell nucleus is enucleated using two photon laser scanning microscopy

18. The method of claim 14, wherein the recipient cell is visualized and enucleated using two photon laser scanning microscopy.

5v609 19. A method of producing a transgenic avian, comprising the steps of:

15 (i) providing an avian recipient cell,

(ii) visualizing the nuclear material of the recipient cell using light in the near-infrared region;

- (iii) enucleating the recipient cell;
- (viii) introducing a transgenic avian donor nucleus into the recipient cell to produce a reconstructed avian zygote;
- (ix) activating the reconstructed zygote; and
- (vi) allowing the reconstructed zygote to develop to term.

20. The method of claim 19, wherein the transgene codes for a protein selected from the group consisting of human growth hormone, interferon,  $\beta$ -casein,  $\alpha$ -1 antitrypsin, antithrombin III, collagen, factor VIII, factor IX, factor X, fibrinogen, hyaluronic acid, insulin, lactoferrin, protein C, erythropoietin (EPO), granulocyte colony-stimulating factor (G-CSF), granulocyte macrophage colony-stimulating factor (GM-CSF), tissue-type plasminogen activator (tPA), feed additive enzymes, somatotropin, and chymotrypsin.

21. A method for producing a protein, comprising:

- (i) producing a transgenic avian according to the method of claim 20 wherein the transgene encodes an exogenous protein, said protein deposited in the white of the developing eggs of said avian; and
- (ii) harvesting hard shell eggs; and
- (iii) isolating the exogenous protein from said eggs.

22. The method of claim 21, wherein the exogenous protein is selected from the group consisting of human growth hormone, interferon,  $\beta$ -casein,  $\alpha$ -1 antitrypsin, antithrombin III, collagen, factor VIII, factor IX, factor X, fibrinogen, hyaluronic acid, insulin, lactoferrin, protein C, erythropoietin (EPO), granulocyte colony-stimulating factor (G-CSF), granulocyte macrophage colony-stimulating factor (GM-CSF), tissue-type plasminogen activator (tPA), feed additive enzymes, somatotropin, and chymotrypsin.

~~23. An intact hard-shell egg containing protein exogenous to the egg.~~

24. A method of claim 19 wherein the avian is a knock-out or knock-in avian.

25. An intact hard-shell egg containing less than the normal complement of endogenous proteins found in the egg.

26. A reconstituted avian embryo prepared by transferring the nucleus of a donor cell into a suitable recipient cell.

27. An embryo of claim 26 in which the donor cell is quiescent.